

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : KONICA CORP

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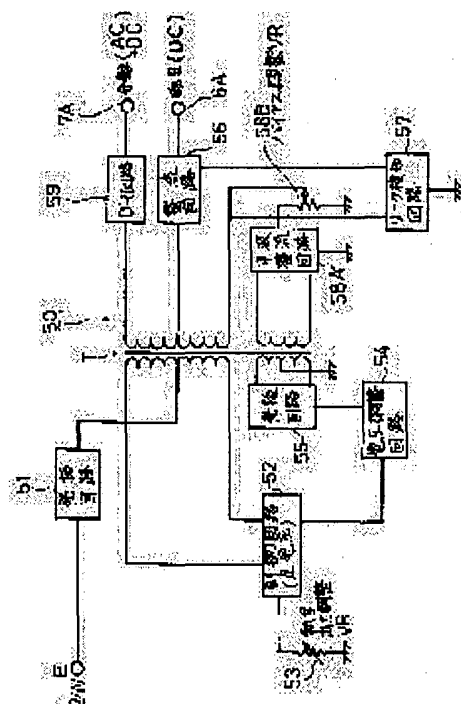
(72)Inventor : UEDA MASATO

## (54) TRANSFER/SEPARATION DEVICE OF IMAGE FORMING DEVICE

## (57)Abstract:

**PURPOSE:** To avoid dependence on the environment and to reduce cost and space at transfer and separation portions that adjoin each other by providing a transfer electrode and a separation electrode which use power sources that produce outputs using the same transformer, and controlling a transfer voltage to a steady state.

**CONSTITUTION:** The transfer electrode 6A of a transfer machine and the separation electrode 7A of a separator use power sources that produce outputs using the same transformer, with a transfer voltage controlled to a constant-voltage state. A 24V of DC power supply E is oscillated by an oscillator circuit 51 and input to a transformer on the primary side. With a transfer voltage adjusted by a transfer output adjusting resistance 53, an output on the secondary side is rectified by a rectifier circuit 56, and a constant transfer voltage is applied to the transfer electrode 6A. A separation voltage is applied to the separation electrode 7A in the form of a DC component being superimposed on an AC component via a DR circuit 59 which comprises a diode and a resistance. A leakage current from the transfer electrode 6A during transfer is detected by a leak detector circuit 57 and adjusted by a bias adjusting resistance 58B.



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**CLAIMS**

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[Claim(s)]

[Claim 1] An imprint and decollator of the image formation equipment which considers as imprint / separation electrode using the power supply which outputs the imprint electrode which imprints the toner image on an image support in the record paper, and the separation electrode which separates the recording paper which finished the imprint from an image support by the same transformer, and is characterized by controlling the voltage of an imprint uniformly.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the imprint and decollator which separates the recording paper which finished the imprint in the record paper, and the imprint for the toner image formed on the image support (electrophotography photo conductor) in image formation equipments, such as an electrophotography copying machine.

[0002]

[Description of the Prior Art] With image formation equipments, such as an electrophotography copying machine, image recording in the record paper is performed through the process of electrification, exposure, development, an imprint and separation, and fixing. For example, the electrification machine, the imprint machine, eliminator, and electric discharge machine which is an image support and which performs corona discharge in the periphery section of a photo conductor drum are formed, and the high-voltage-power-supply unit is connected, respectively. The proposal which communalizes these high-voltage-power-supply units conventionally is also made, and JP,55-122379,A and an application-for-a-utility-model-patent No. 60146 [ Showa 57 to ] specification are the proposals about this.

[0003]

[Problem(s) to be Solved by the Invention] Since the proposal which is going to communalize these high-voltage-power-supply units is mainly charged, with imprint / separation section, it is separated, and it controlled and had a problem of \*\*\*\*\*. Moreover, although the constant current power supply was conventionally used as these high-voltage-power-supply units, since the optimal current value changed with environmental conditions, about the imprint electrode, controlling current value by the environmental condition was also made.

[0004] this invention aims at offer of the imprint and decollator of image formation equipment which eliminated the environmental dependency and aimed at the adjoining cost in imprint / separation section and the adjoining reduction of a space.

[0005]

[Means for Solving the Problem] The above-mentioned purpose is attained by the image formation equipment which considers as imprint / separation electrode using the power supply which outputs the imprint electrode which imprints the toner image on an image support in the record paper, and the separation electrode which separates the recording paper which finished the imprint from an image support by the same transformer, and is characterized by controlling the voltage of an imprint uniformly.

[0006]

[Example] Hereafter, the example of this invention is explained based on a drawing.

[0007] Drawing 3 is the transverse-plane cross section of the copying machine which is an example of the image formation equipment concerning this invention. the circumference of the photo conductor drum 1 which is the image support which illustration prepared in the center section possible [ rotation ] clockwise mostly in drawing -- the upper part -- the electrification machine 2 and black frame removal electric discharge -- a member 3 and the light source 4 for electric discharge -- illustration right-hand side -- a development counter 5 -- an illustration lower part -- the imprint machine 6, an eliminator 7, and the separation presser foot stitch tongue 8 -- moreover, cleaning equipment 9 is arranged at the illustration left 40 is the manuscript exposure scanning section, and it scans a manuscript picture, it is made it to carry out projection image formation to the peripheral surface of the photo conductor drum 1, and it forms a latent image.

[0008] the black frame removal electric discharge after, as for the peripheral surface of the rotating photo conductor drum 1, corona discharge was uniformly given with the electrification vessel 2 and electrification was made -- by the member 3, exposure to outside the limit [ screen ] is performed, and electric discharge of a screen outside the limit is

made To within the limit [ screen ], image exposure is made by the manuscript exposure scanning section 40, and a latent image is formed of it. The development by the development counter 5 is made to the latent-image portion on this photo conductor drum 1, and it becomes a toner image.

[0009] The middle feeding means 31 which consists of a roller pair under the development counter 5 is arranged, and the recording paper sent out from the feed cassette 32 located in the lower part of image formation equipment or the manual paper feed means 33 of the method of the equipment right carries out timing adjustment with the part for an aforementioned screen frame part, and is fed to the imprint section. In the imprint section, the high-voltage-direct-current bias of a toner and reversed polarity is impressed with the imprint vessel 6 behind behind the photo conductor drum 1 and the recording paper in an adhesion state, and, as for the toner image on the photo conductor drum 1, movement and an imprint are made to the recording paper. The recording paper which finished the imprint dissociates by impressing and discharging the AC bias which superimposed an alternating current or a direct current behind behind the recording paper with the eliminator 7 in the separation section which adjoined the imprint section. It is fixed to the recording paper with which separation was further made by the separation presser foot stitch tongue 8 with the eliminator 7 in the separation section by fixing equipment 34, and it is discharged on the delivery pan 36 with the conveyance roller 35.

[0010] this invention is used as imprint / separation electrode using the power supply which outputs imprint electrode 6A of the imprint machine 6 and an eliminator 7, and separation electrode 7A by the same transformer, the voltage of an imprint is controlled in the constant-voltage state, and drawing 1 is one example of the block circuit diagram of the power supply which communalized imprint / separation electrode. The left-hand side of the transformer T of drawing is [ the right-hand side of Transformer T ] a secondary a primary side. It oscillates by the oscillator circuit 51 and DC power supply E of 24V are inputted into the transformer by the side of primary. 52 is a constant-voltage control circuit, a rectifier circuit 56 rectifies the output of a secondary on the imprint voltage adjusted by the imprint output adjusting resistance 53, and the imprint voltage of a constant voltage is impressed to imprint electrode 6A. Moreover, isolation voltage is impressed to separation electrode 7A in the form which superimposed the dc component on the alternating current component through the DR circuit 59 which consists of diode and resistance. In addition, 54 is the power circuit of voltage adjustment, 55 is an oscillator circuit, 58A is a half wave rectifier circuit, 58B is bias-compensation resistance, and 57 is a leak detection circuit. The leakage current (current which flows between a back plate and grounding) from imprint electrode 6A at the time of an imprint is detected by the leak detector 57, and is adjusted by bias-compensation resistance 58B. Moreover, it oscillated by the oscillator circuit 55, and in half-wave-rectifier-circuit 58A, through resistance by the aforementioned bias-compensation resistance 58B, it connected with the secondary of Transformer T and the output from the power circuit 54 controlled by the constant-voltage control circuit 52 has amended change of the imprint voltage by leak.

[0011] this invention removes the influence an environmental condition affects an imprint by controlling the voltage of an imprint uniformly while using it as imprint / separation electrode using the power supply which outputs an imprint electrode and a separation electrode by the same transformer, as shown in drawing 1 .

[0012] Next, the effect by controlling imprint voltage uniformly is explained. Drawing 2 (a) is what showed change of an electric discharge impedance when an environmental condition changes to low-humidity/temperature (L. L...10 degrees C, RH20%), ordinary temperature normal relative humidity (N. N...20 degrees C, RH50%), and high-humidity/temperature (H. H...30 degrees C, RH80%), and it is shown at the time of high-humidity/temperature that an electric discharge impedance falls sharply. Drawing 2 (b) shows the discharge current value when performing a constant-voltage imprint, when an environmental condition changes. the range of the imprint discharge current value with which drawing 2 (c) is satisfied of the imprint conditions (effect) on which it approves when an environmental condition changes -- a slash -- with, the discharge current curve ( drawing 2 (c) is shown with a dotted line) when performing the constant-voltage imprint which is what was shown and was shown by drawing 2 (b) -- this slash -- with, it is shown that it is in shown permission imprint discharge current within the limits That is, the imprint of good imprint efficiency will be made by controlling uniformly the imprint voltage set up suitably, without being influenced of an environmental condition.

[0013] In addition, when based on this invention, separation by the constant voltage is performed like [ separation ] an imprint, it is not influenced of an environmental condition but good separation is performed.

[0014]

[Effect of the Invention] When the distance of an imprint pole and a separation pole is close like an example, by using imprint and separation as a common transformer, control becomes easy and the effect of reducing cost and a space produces it. Moreover, by making imprint voltage into a constant voltage, the dependency to an environmental condition will decrease and an always good imprint will be performed.

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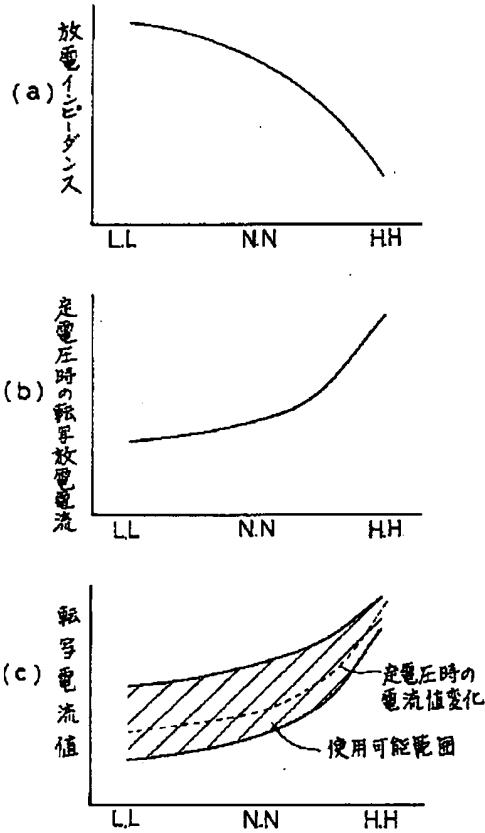
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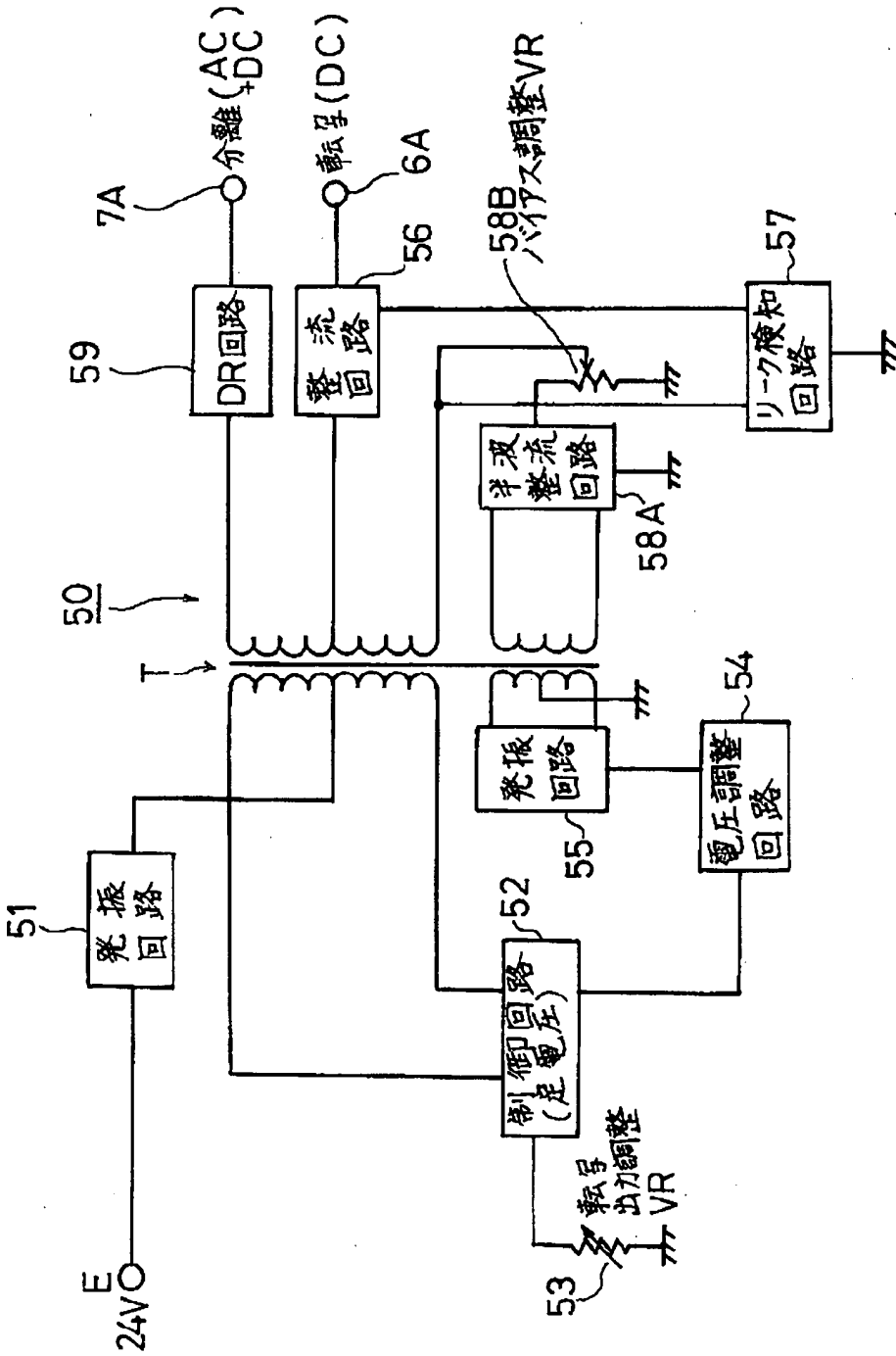
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DRAWINGS

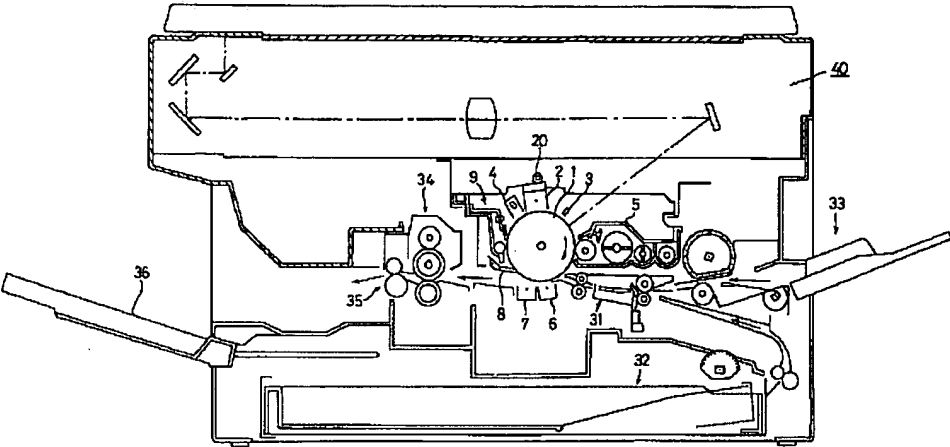
[Drawing 2]



[Drawing 1]



[Drawing 3]



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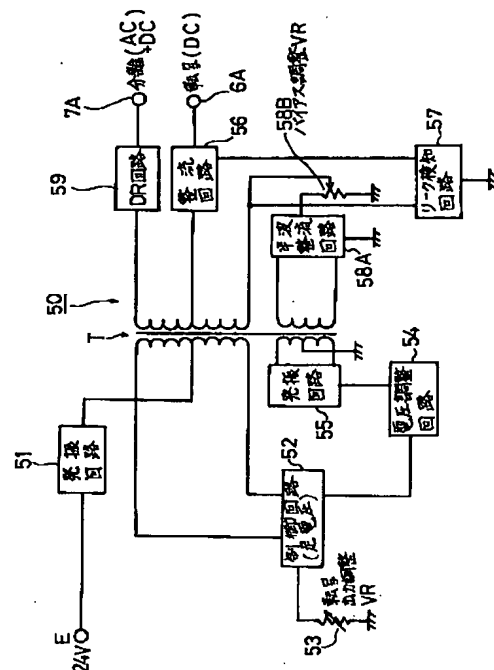
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(54) 【発明の名称】 画像形成装置の転写・分離装置

(57) 【要約】

【目的】 高圧電源の小型化・低コスト化をはかり、共通化電源の制御性を向上して、特に転写電極における環境依存性の改善をはかる。

【構成】 転写電極6Aと分離電極7Aとを同一のトランスTで出力する電源Eを用いた転写・分離極とし、転写の電圧を一定に制御して定電圧転写を行う。



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## 【特許請求の範囲】

【請求項1】 像担持体上のトナー像を記録紙上に転写を行う転写電極と、転写を終えた記録紙を像担持体より分離する分離電極とを同一のトランスで出力する電源を用いた転写・分離電極とし、転写の電圧を一定に制御することを特徴とする画像形成装置の転写・分離装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、電子写真複写機等の画像形成装置での像担持体（電子写真感光体）上に形成されたトナー像を記録紙上への転写と、転写を終えた記録紙の分離を行う転写・分離装置に関するものである。

## 【0002】

【従来の技術】 電子写真複写機等の画像形成装置では、帯電・露光・現像・転写・分離と定着の工程を経て記録紙上への画像記録が行われる。像担持体である例えば感光体ドラムの周縁部には、コロナ放電を行う帯電器・転写器・分離器・除電器が設けられ、それぞれ高圧電源ユニットが接続されている。従来これらの高圧電源ユニットを共通化する提案もなされていて、特開昭55-122379号公報や実願昭57-60146号明細書はこれに関する提案である。

## 【0003】

【発明が解決しようとする課題】 これらの高圧電源ユニットを共通化しようとする提案は、帯電を主に行うものであるため転写・分離部とは離れていて制御しづらいという問題があった。また、従来これらの高圧電源ユニットとしては定電流電源が用いられているが、最適な電流値は環境条件によって変化するため、特に転写電極等については環境条件によって電流値を制御することもなされていた。

【0004】 本発明は環境依存性を排除し、隣接した転写・分離部でのコストやスペースの低減をはかった画像形成装置の転写・分離装置の提供を目的とする。

## 【0005】

【課題を解決するための手段】 上記目的は、像担持体上のトナー像を記録紙上に転写を行う転写電極と、転写を終えた記録紙を像担持体より分離する分離電極とを同一のトランスで出力する電源を用いた転写・分離電極とし、転写の電圧を一定に制御することを特徴とする画像形成装置によって達成される。

## 【0006】

【実施例】 以下、本発明の実施例を図面に基いて説明する。

【0007】 図3は本発明に係る画像形成装置の一例である複写機の正面断面図である。図において、図示のほぼ中央部には時計方向に回転可能に設けた像担持体である感光体ドラム1の周囲で上方には帯電器2、黒枠除去電部材3、除電用光源4が、図示右側には現像器5が、図示下方には転写器6、分離器7、分離爪8が、ま

た図示左方にはクリーニング装置9が配置されている。40は原稿露光走査部で、原稿画像を走査して感光体ドラム1の周面に投影結像させ潜像を形成する。

【0008】 回転する感光体ドラム1の周面は帯電器2によって一様にコロナ放電が施され、帯電がなされたのち黒枠除去電部材3によって画面枠外に対する露光が行われ、画面枠外の除電がなされる。画面枠内に対しては原稿露光走査部40によって像露光がなされ潜像が形成される。この感光体ドラム1上の潜像部分に対しては現像器5による現像がなされてトナー像となる。

【0009】 現像器5の下方にはローラ対から成る中間給紙手段31が配置され、画像形成装置の下部に位置した給紙カセット32または装置右方の手差し給紙手段33から送り出された記録紙は前記の画面枠部分とタイミング調整して転写部へ給紙される。転写部においては感光体ドラム1と付着状態にある記録紙の背後からトナーと逆極性の高圧直流バイアスが転写器6によって印加され、感光体ドラム1上のトナー像は記録紙へ移動・転写がなされる。転写を終えた記録紙は、転写部に隣接した分離部において分離器7により記録紙の背後から交流又は直流を重ねた交流バイアスを印加して除電し分離を行う。分離部において分離器7により更に分離爪8により分離がなされた記録紙は、定着装置34によって定着され、搬送ローラ35によって排紙皿36上に排出される。

【0010】 本発明は、転写器6と分離器7の転写電極6Aと分離電極7Aとを同一のトランスで出力する電源を用いた転写・分離電極とし、転写の電圧を定電圧状態に制御するもので、図1は転写・分離電極を共通化した電源のブロック回路図の1例である。図のトランスTの左側が1次側、トランスTの右側が2次側である。24Vの直流電源Eは発振回路51で発振し、1次側のトランスへ入力する。52は定電圧制御回路で、転写出力調整抵抗53によって調整された転写電圧で2次側の出力を整流回路56によって整流され、転写電極6Aには定電圧の転写電圧が印加される。また分離電極7Aには、ダイオードと抵抗よりなるDR回路59を介して直流成分を交流成分に重ねた形で分離電圧が印加される。なお54は電圧調整の電源回路であり、55は発振回路、58Aは半波整流回路で、58Bはバイアス調整抵抗で、57はリーク検出回路である。転写時の転写電極6Aからのリーク電流（バックプレートと接地間に流れる電流）はリーク検出回路57によって検知され、バイアス調整抵抗58Bにより調整される。また定電圧制御回路52によって制御された電源回路54からの出力は発振回路55によって発振し、半波整流回路58Aでは前記のバイアス調整抵抗58Bによる抵抗を介して、トランスTの2次側に接続しリークによる転写電圧の変動を補正している。

【0011】 本発明は図1に示すように転写電極と分離電極とを同一のトランスで出力する電源を用いた転写・分離電極とすると共に、転写の電圧を一定に制御するこ

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とによって環境条件が転写に及ぼす影響を除去したものである。

【0012】次に転写電圧を一定に制御することによる効果について説明する。図2(a)は環境条件が低温低湿(L.L・・・10℃, RH20%), 常温常湿(N.N・・・20℃, RH50%), 高温高湿(H.H・・・30℃, RH80%)に変化したときの放電インピーダンスの変化を示したもので、高温高湿時には放電インピーダンスが大幅に低下することを示している。図2(b)は環境条件が変化したとき、定電圧転写を行ったときの放電電流値を示している。図2(c)は環境条件が変化したときの、許容される転写条件(効果)を満足する転写放電電流値の範囲を斜線を以て示したもので、図2(b)で示した定電圧転写を行ったときの放電電流曲線(図2(c)においては点線をもって示す)はこの斜線を以て示す許容転写放電電流範囲内にあることを示している。即ち適当に設定した転写電圧を一定に制御することによって、環境条件の影響を受けることなく良好な転写効率の転写がなされることとなる。

【0013】なお本発明によるときは、分離についても転写同様に定電圧による分離が行われて、環境条件の影響を受けず良好な分離が行われる。

【0014】

【発明の効果】実施例のように転写極と分離極との距離が近接している場合には、転写と分離とを共通のトラン

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スにすることによって制御は簡単となり、コスト及びスペースを低減させる効果が生じる。また転写電圧を定電圧にすることによって、環境条件への依存性が低減し、常に良好な転写が行われることとなる。

【図面の簡単な説明】

【図1】本発明の転写・分離部のブロック回路図である。

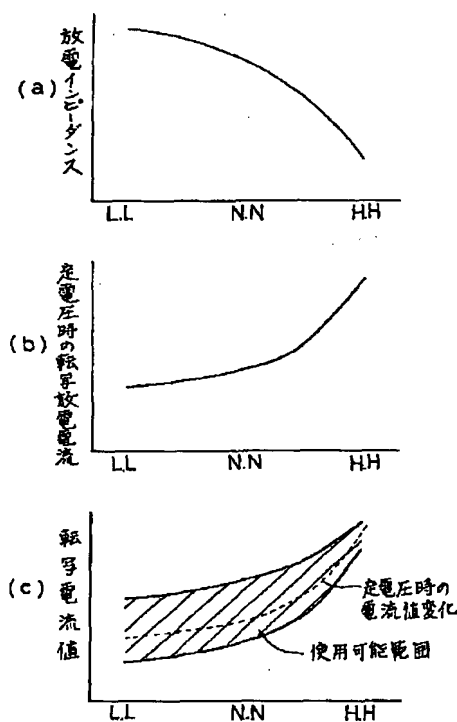
【図2】環境条件が変化したときの転写条件を示したもので、(a)は放電インピーダンス、(b)は定電圧転写時の放電電流、(c)は使用可能範囲を示す。

【図3】本発明の一実施例の画像形成装置の正面断面図である。

【符号の説明】

- 1 感光体ドラム
- 6 転写器
- 6A 転写電極
- 7 分離器
- 7A 分離電極
- 50 転写・分離回路
- 51 発振回路
- 52 定電圧制御回路
- 56 整流回路
- 59 DR回路
- E 電源
- T トランス

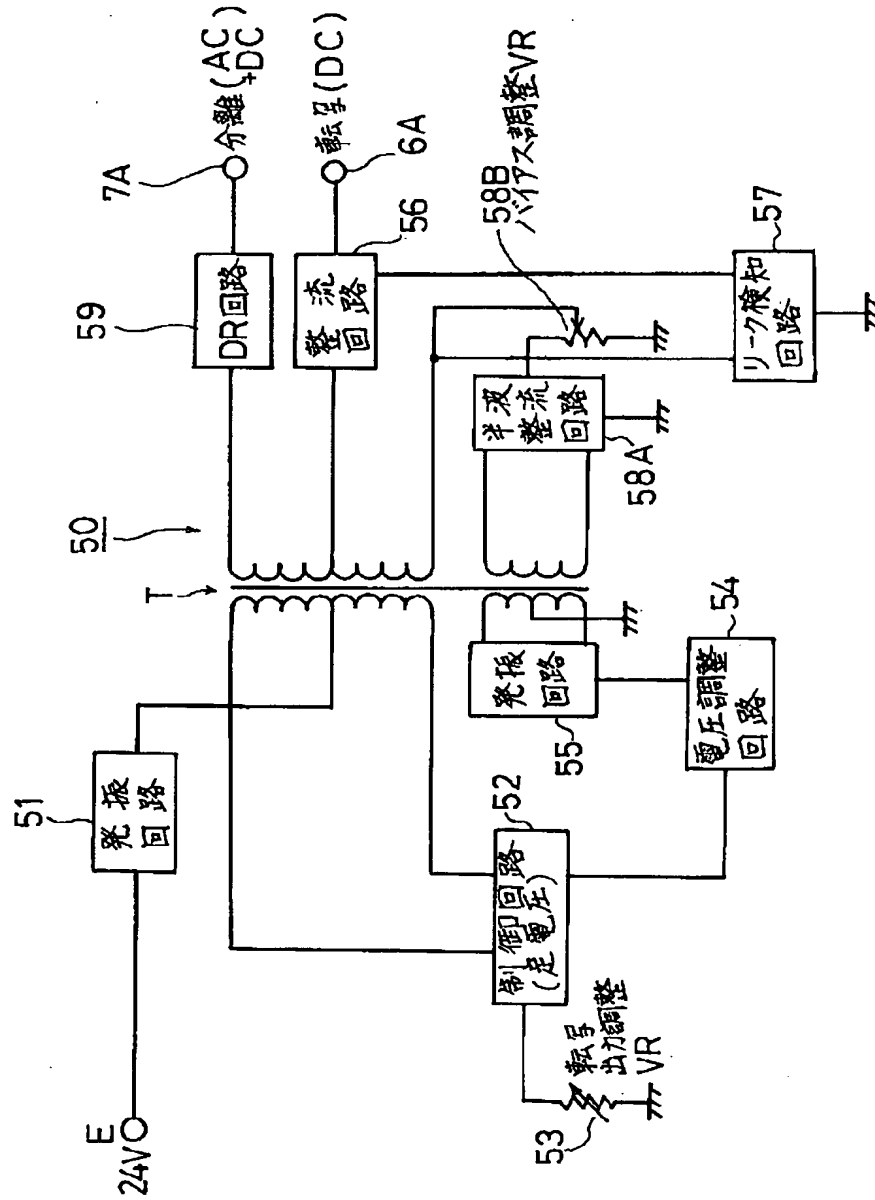
【図2】



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【図 1】



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【図 3】

